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Forests and our Environments

Purdue University Cooperative Extension Service

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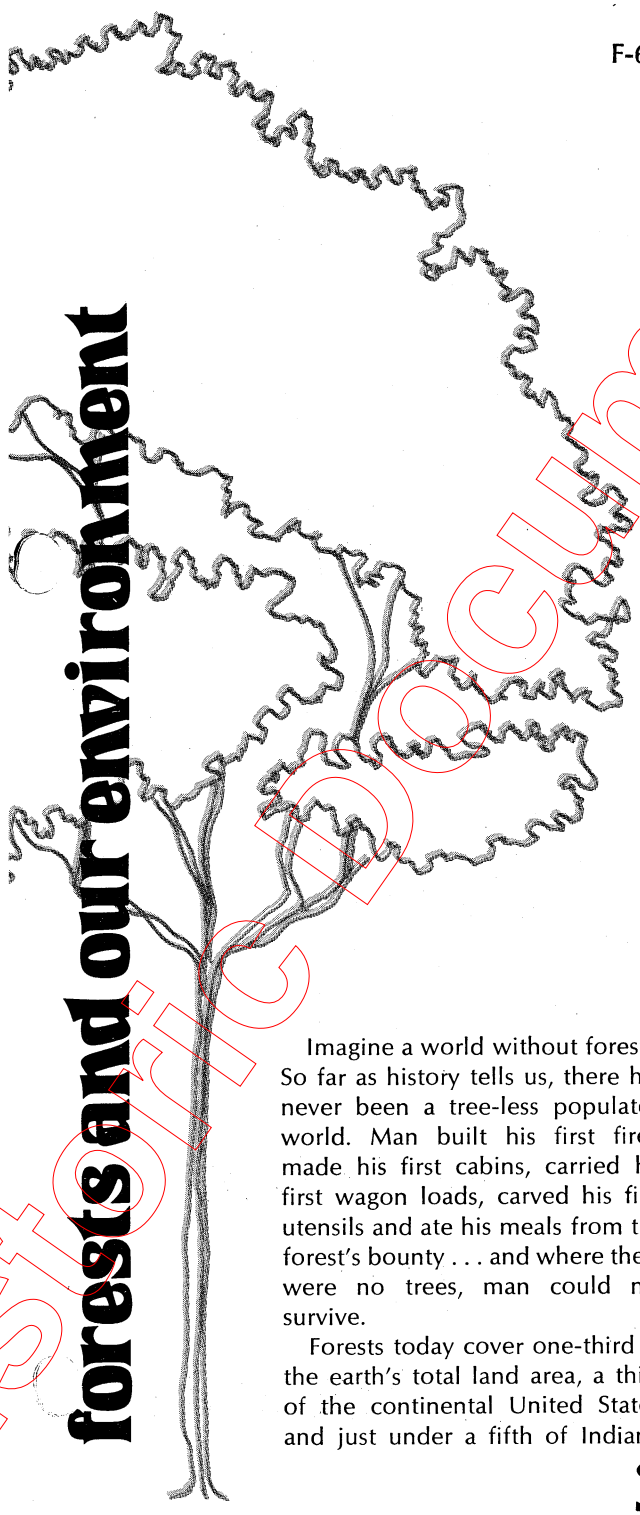

forests and our environment

Imagine a world without forests! So far as history tells us, there has never been a tree-less populated world. Man built his first fires, made his first cabins, carried his first wagon loads, carved his first utensils and ate his meals from the forest's bounty . . . and where there were no trees, man could not survive.

Forests today cover one-third of the earth's total land area, a third of the continental United States, and just under a fifth of Indiana.

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Forests are useful. The value of the forest for timber products, wildlife, protection of soil and water, outdoor recreation and natural beauty has long been recognized. But forests serve man in other ways, not so often noticed, but equally vital to life. Forests help provide man with a comfortable and safe environment . . . they clean the air, make oxygen, absorb noises from civilization, remove odors, and help temper the climate. They also provide a place for quiet, rest and inspiration—relief from a hectic world.

The forest is a vital part of man's environment! It not only provides materials for his home, helps to feed him, clothe him, and give him rest, but it also protects him from many of his own unpleasantries, keeps him comfortable, and helps to preserve his heritage.

Forests have been part of the earth for all of recorded time, and with careful management, they will continue to serve man.

4 what is a forest?

A forest is a community of both living things —plants and animals—and non-living substances. Ecology is the study of the relationships between these plants and animals and their environment. When studying a forest community, the ecologist thinks of it in terms of an ecological system, or ecosystem. The idea of the forest as an ecosystem, in which each element is related to the other, is helpful to the understanding of the important role of forests and how they contribute to the quality and stability of our environment.

The hardwood forests of Indiana are complex ecosystems. The trees are members of the group known as hardwoods, which are the broad-leafed trees that shed their leaves in the winter. The ground under the trees is covered with many seedlings, shrubs and plants, while the soil is alive with billions of bacteria, fungi, soil mites, earthworms, insects, and other organisms. Many types of animal life, large and small, are also present in the forest.

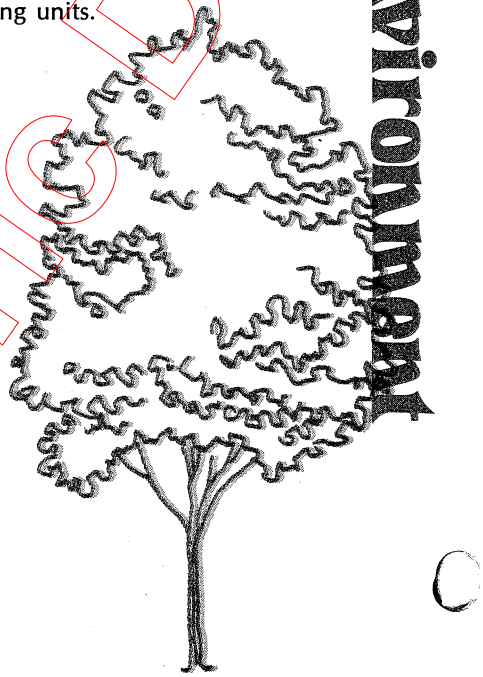
The hardwood forest is also very efficient at conserving plant nutrients. When leaves, twigs, branches and trees die and fall to the ground, they are soon decomposed and returned to the soil. The forest thus re-cycles these materials through its own waste disposal system. The materials and humus covering the soil help to reduce water run-off, and thus reduce the loss of plant foods.

effects of forests on our environment

Forests are one of the most useful, versatile parts of the environment. They serve man both directly and indirectly, from keeping him cool to giving him shelter. Following are some of the benefits of forests.

Reduce Air Temperature: The leaves and branches of trees reduce the amount of sunlight that reaches the ground and act as a blanket to deflect heat radiation from the ground. On a warm summer day, the temperature in a forest may be as much as 8° to 10° F. cooler during the day and 6° F. warmer at night than in nearby open areas.

Transpiration: The movement of moisture from the soil through the trees to the leaves, where it is evaporated, is known as *transpiration*. During a hot summer day a large tree evaporates up to 100 gallons of water, which helps to cool the air. It has been estimated that the cooling effect provided by one large tree may be equal to that produced by five or more room-sized air conditioning units.



Reduce Wind Velocity: The crowns of trees are effective in slowing wind movement. The extent a forest will decrease wind speed depends on the number of trees per acre and the velocity of the wind. A wind of four miles per hour may be reduced only slightly, while a wind of 30 miles per hour may be reduced to as little as five miles per hour in a dense forest.

Suppress Loud Sounds: Forests absorb sound and make it less intense. A forest or tree barrier may suppress sound sufficiently to make a noisy location a relatively pleasant place to live. For example, a wooded barrier 300 to 400 feet deep along a busy highway can suppress traffic noise to a reasonable level for people living near the highway.

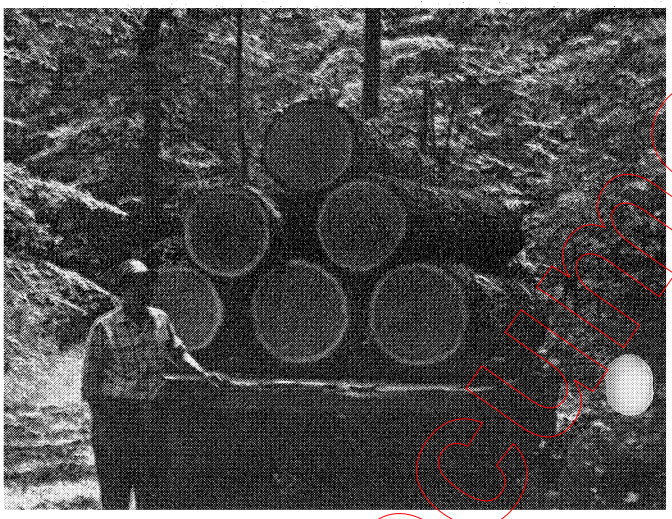
Produce Oxygen: As trees use the process of photosynthesis, using sunlight as energy to combine carbon dioxide from the air with water, to manufacture food, oxygen is produced. It has been figured that for every ton of wood grown, forests consume 1.47 tons of carbon dioxide, and release 1.07 tons of oxygen. A mature forest producing very little new growth consumes about as much oxygen as it produces, while a younger, vigorous forest, subjected to timber harvest, produces more oxygen than it uses. Managing forests and trees to keep them healthy and vigorous increases their capacity to perform this important ecological role.

Improve Air Quality: In the process of photosynthesis and respiration forest trees take in and expel large volumes of air. The leaves of the trees effectively intercept and filter dust particles, along with unpleasant odors, from the air. Trees in and around cities have been found to be of major importance in controlling air and noise pollution, as well as for their scenic value.

products and services from our forests

Besides these vital contributions to the environment, our forests provide many economically important products and services; for instance, wildlife habitat, scenic beauty, protection of our soil and water, and forest products of almost unlimited variety.

Wildlife: Many wild animals, which are an essential part of the forest ecosystem, depend on the forest for food and shelter. Forests which have scattered openings and borders of shrubs and brush provide excellent habitat for a wide variety of animals. Properly planned timber harvesting encourages the growth and fruiting of small trees and shrubs that provide this food and cover for wild animals.

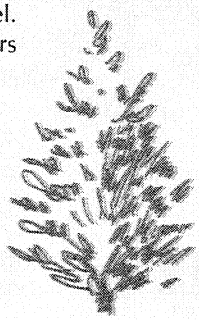


Timber As A Crop: The trees of the forest are a *renewable natural resource* and with proper management and cutting practices will continue to grow repeated crops. When forests are managed, they are protected from grazing by domestic livestock, from fire, and from insects and diseases. Timber is harvested with good forestry practices, which will assure repeated tree crops for the future. The hardwood forests of Indiana can be managed primarily to grow trees as a crop and to provide wood for many products needed by our growing population.

Scenic Beauty: Forests and trees add beauty and interest to the landscape and they provide the setting for many forms of outdoor recreation. They serve to make life more pleasant, with their beautiful foliage in the fall and bright flowers in the spring.

Protection of Soil and Water: When rain falls on a forest, part of it is intercepted by the tree crowns, branches and foliage, while part of the rain drips from leaves or runs down the tree trunks into the soil. The forest floor, with its fallen leaves, twigs, and

branches, cushions the impact of the falling rain, thus preventing rapid water runoff and soil erosion. The loose litter on the forest floor enables water to filter slowly into the soil and reach the ground water level. Thus, forests serve as water regulators and purifiers.



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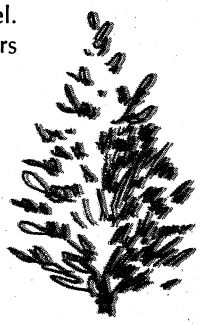
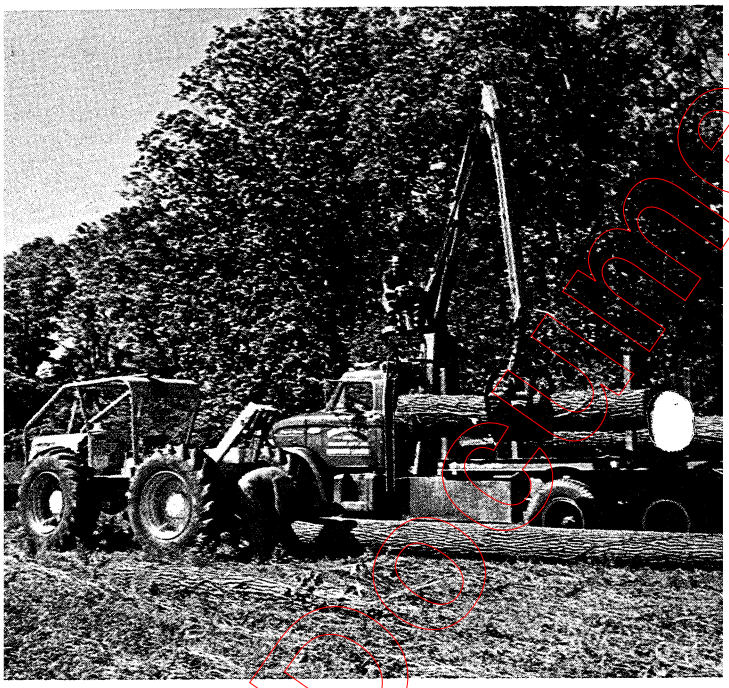


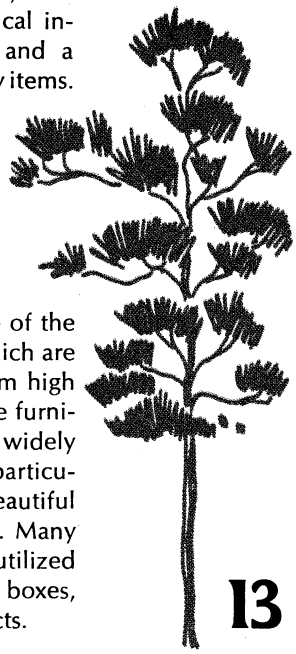


Using good management, including harvest of mature or ripe trees and forest improvement cutting, the timber productivity of the over mature forest, one in which growth is slowed by age, can be increased and maintained at a high level. Thus, the hardwood forest composed of trees of various ages can be managed as a continuous and renewable crop and still provide wildlife, recreation, beauty and many other contributions to a quality environment. This is known as the *multiple-use* management of forest lands.

This is not to deny that there is a need to preserve some mature forests as "reference libraries" and genetic pools. These can serve as guides for forest management decisions and as examples of how natural processes operate.

Forests and Industry: Wise use of wood resources to provide products for everyday use is an excellent way to actually improve the environment. Proper cutting practices help keep the forest young and thrifty. In addition, the process of manufacturing the trees and logs into lumber and other wood products actually uses far less power and causes less pollution than the manufacturing processes needed to produce substitutes, wood imitations and other competitive products. Thus, wood-using industries are utilizing one of our few renewable natural resources to produce many necessary products, and at the same time are improving these resources for future generations.

Indiana is known world-wide for its production of fine hardwood timber. White oak and black walnut logs have long been exported to European countries. Because of their quality, our hardwoods are widely used for such products as fine furniture, baskets, implement handles, musical instruments, ball bats, barrels, and a tremendous variety of every-day items.



Indiana also ranks at the top of the production of face veneers, which are thin sheets of wood sliced from high quality logs and used to surface furniture. Hoosier hardwoods are widely used in home construction, particularly to provide durable and beautiful panneling and hardwood floors. Many of the lesser quality trees are utilized for such things as paper, pallets, boxes, fences and many other products.

Indiana Tree Farm Committee

in cooperation with:

Cooperative Extension Service,
Purdue University

Division of Forestry, Indiana Department
of Natural Resources

U. S. Soil Conservation Service

Indiana Hardwood Lumbermen's Association

U. S. Forest Service

Fine Hardwoods—American Walnut Association

American Forest Institute

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1-500

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